PRINTER RUSH
(PTO ASSISTANCE)

EFW

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[RUSH] **MESSAGE:** Please verify if there should be CONTINUING DATA. Div of 10/13/89, ON AD, b Sheet, NOT IN Spec.

Thank You
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[XRUSH] **RESPONSE:**

INITIALS:

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REV 10/04

PARTIALLY TRANSPARENT PHOTOVOLTAIC MODULES

Field of the Invention

This application claims the benefit of U. S. Provisional Application No. 60/216,415 filed July 6, 2000, 60/220,346 filed July 24, 2000 and 60/221,627 filed July 28, 2000. This application is a Div of 10/131,859, 04/25/2002

The present invention relates to partially transparent photovoltaic cells and modules and methods for their manufacture. More particularly, the present invention relates to partially transparent amorphous silicon photovoltaic cells and modules wherein the transparency is provided by removing at least part of the back contact layer of the photovoltaic cell. This invention also relates to photovoltaic modules where the removal of the back contact can be used to form a design or logo on the photovoltaic modules so that when viewed from the front or back the design or logo is apparent.

A conventional thin film photovoltaic cell typically includes a front contact disposed on a substrate wherein the front contact is made of, for example, a metal oxide such as tin oxide, a p-i-n or PIN junction and a back or rear contact made of, for example, a metal such as aluminum. The p-i-n or PIN junction includes a layer of a semiconductor material doped with a p-type dopant to form a p-layer, an undoped layer of a semiconductor material that forms an intrinsic or i-layer, and a layer of a semiconductor material doped with an n-type dopant to form an n-layer. Light incident on the substrate passes through the substrate, the front contact, and the p-i-n junction. The light is reflected by the rear contact back into the p-i-n junction. However, since the back contact generally covers the entire surface of the photovoltaic cell, the cell is opaque when the back contact is made of a metal such as aluminum and does not transmit or allow any light to pass through. In certain applications, however, it would be desirable to have a photovoltaic cell that is efficient for converting light energy into electrical energy yet provides for the transmission of light through the cell. It would also be desirable to have an efficient method to manufacture such photovoltaic cells. Photovoltaic cells with such capability would be very desirable in applications of the photovoltaic cell such as windows, sun screens, canopies and other uses where it is desirable to see through the photovoltaic cell or to have a certain amount of the light incident on the cell pass through the cell. The